

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
25 March 2004 (25.03.2004)

PCT

(10) International Publication Number
WO 2004/024554 A2

(51) International Patent Classification⁷: B63B 23/00

(21) International Application Number:
PCT/US2003/028777

(22) International Filing Date:
11 September 2003 (11.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/409,914 11 September 2002 (11.09.2002) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

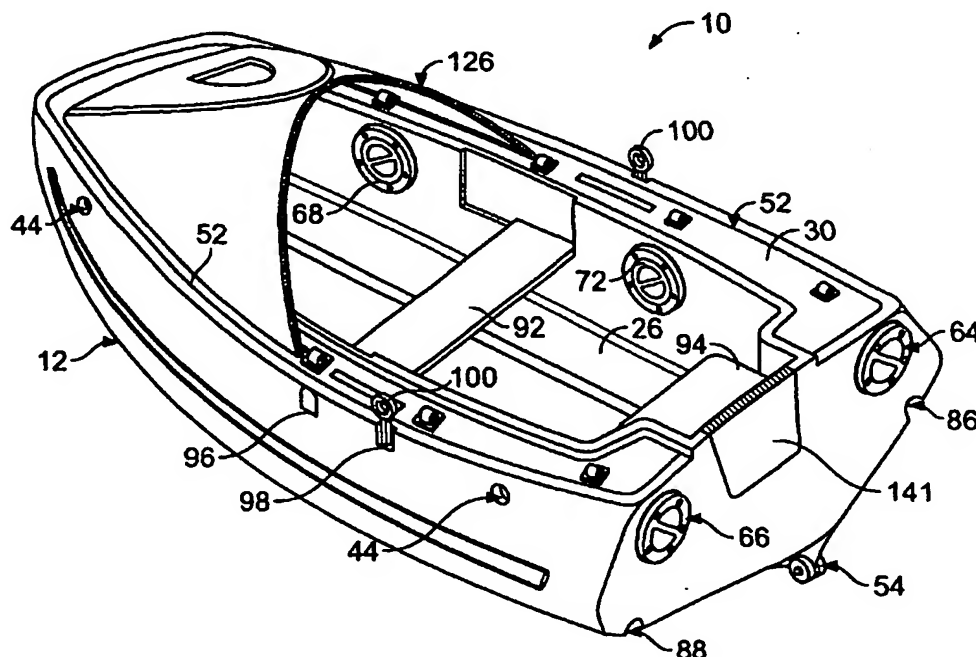
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Published:
— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SERVICE AND SURVIVAL DINGHY



(57) Abstract: A dual-function service and survival dinghy (10) for use, e.g., with a sailboat or powerboat, has flotation capacity comparable to a life raft, and it is designed and constructed to be lightweight, rigid, durable, and easily towed and rowed.

5

SERVICE AND SURVIVAL DINGHY

This application claims benefit from U.S. Provisional Patent Application No. 60/409,914, filed September 11, 2002.

TECHNICAL FIELD

This invention relates to dinghies, and more particularly to dinghies to be
10 carried or towed by sailboats and powerboats, for use in survival situations and/or for use in tender, service, and other utility applications.

BACKGROUND

Many boaters find it necessary to tow or carry a dinghy, e.g., for access
between offshore mooring and a dock or shore. Traditional rigid dinghies may be
15 formed of wood, plastic or fiberglass; inflatable dinghies are also employed. When swamped, rigid dinghies are usually designed and constructed to remain minimally afloat, but often fill completely with water. The water cannot be pumped out, and it makes the dinghy difficult or impossible to row, and extended exposure to cold water is hazardous and can be fatal. The popular rubber inflatable dinghy, filled with air, is
20 subject to puncture and leaks, and it is not aesthetically pleasing. Inflatable life rafts are very expensive, take up space, and they are designed to be static in the water, i.e., not sailed or rowed.

SUMMARY

According to the invention, a service and survival dinghy comprises a double
25 hull formed of impact resistant polymeric material and defining a bottom compartment containing closed-cell foam for permanent flotation capability and sidewall compartments accessible for storage.

Preferred embodiments may include one or more of the following additional features. The double hull is formed of rotation-molded polyethylene or other suitable
30 plastic. The service and survival dinghy further comprises a sailing rig comprising a mast and sail. Preferably, the mast and sail are stored between uses within the sidewall compartments. The service and survival dinghy comprises a center seat mounted to be

5 flipped from a centered position to a position toward the bow, thereby to allow a
rower more legroom. The service and survival dinghy further comprises beackets
mounted to gunwale surfaces. The service and survival dinghy further comprises a
removable exposure canopy. Preferably, the exposure canopy is stored between uses
within the sidewall compartments. More preferably, the exposure canopy comprises
10 multiple separate panels. The service and survival dinghy further comprises a transom
plate mounted in a recessed space in the stern for mounting an outboard motor. The
dinghy is self-draining when empty, with a removable plug. The service and survival
dinghy further comprises a multi-use cylinder secured along a gunwale of the dinghy
and comprising a cover within which there is disposed a deployable web ladder for
15 boarding the dinghy.

A service and survival dinghy of the invention thus offers a higher degree of
safety than provided by traditional rigid and inflatable dinghies, and at a reasonable
cost, i.e., significantly below the cost of most inflatable life rafts and dinghies.

20 The details of one or more embodiments of the invention are set forth in the
accompanying drawings and the description below. Other features, objects, and
advantages of the invention will be apparent from the description and drawings, and
from the claims.

DESCRIPTION OF DRAWINGS

25 FIG. 1 is a perspective view of a service and survival dinghy of the invention.

FIG. 2 is a top plan view of the service and survival dinghy of FIG. 1.

FIG. 3 is a side plan view of the service and survival dinghy of FIG. 1.

FIG. 4 is a similar side plan of the service and survival dinghy of FIG. 1, with a
sail erected and canopy in place.

30 FIG. 5 is a side section view of the service and survival dinghy of FIG. 1, with
the sail erected, as in FIG. 4.

FIG. 6 is an end section view of the service and survival dinghy of FIG. 1,
taken at the line 6-6 of FIG. 2.

FIG. 7 is a side section view of the service and survival dinghy of FIG. 1, with
35 the canopy in place and secured, as in FIG. 4.

5 FIG. 8 is a similar side section view of the service and survival dinghy of FIG. 7, with the canopy open and a boarding ladder deployed.

FIG. 9 is a side section view of the service and survival dinghy of FIG. 1, with motor and a front portion of the canopy in place as a dodger.

10 FIGS. 10-13 are top plan views of the service and survival dinghy of FIG. 1 showing alternative seating arrangements for use of the dinghy in survival situations.

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

Referring now to FIGS. 1-9, an improved service and survival dinghy 10 of the invention will be described with annotations to specific features and options that
15 may be provided, e.g., in preferred embodiments.

The service and survival dinghy 10 of the invention has a double hull 12, consisting of an outer shell 14 and an inner shell 16, both formed of polyethylene composition in a rotation-molding process. The outer surface 18 of each shell 14, 16 is 0.115-inch (2.9 mm) thick UV-stabilized polyethylene, bonded to 0.25-inch (6.35
20 mm) thick closed-cell polyethylene foam 20 at its inner surface 16. (Rigid polyethylene has five times the impact resistance of an equal thickness of fiberglass.) The bottom region 22 of the double hull 12 is filled with lightweight, closed-cell polyurethane foam 24. In a preferred embodiment, the service and survival dinghy 10 has a length, L, e.g. 7 feet, 8 inches (2.34 m), a width, W, e.g. 4 feet, 4 inches (1.32
25 m), and a height, H, e.g. 2 feet, 1 inch (0.64 m). The double hull 12 defines a cubic volume of 19.03 cu. ft. (0.54 m³), with a floor 26 defining a surface area of 16.1 sq. ft. (1.5 m²) (in excess of the 4 sq. ft. (0.37 m²) minimum per person recommended for life rafts). In the preferred embodiment, 1,000 lbs. (454 kg) of dead weight are required for total submersion of the service and survival dinghy 10 when the cockpit
30 28 is filled with water. The boat 10 can support approximately 660 lbs. (300 kg), e.g. four people at 75 kg. each, while maintaining 7¼ inches (2.9 cm) of freeboard.

The floor 26 and the upper surfaces 30 of the gunwale 32 are textured for slip-resistance. The gunwale 32 also has trim 34 around the cockpit 28 to reduce the volume of water entering the cockpit. A drainage groove 36 runs the full length, along
35 the center of the floor, from bow to stern, and a gutter 38 runs about the perimeter of

5 the floor. Both spill into a floor well 40 in the stern for collection of cockpit water. When boat and equipment weigh about 115 lbs. (52.2 kg) or less, the boat is self-bailing through a drain hole 43, secured by a removable plug 42, located in the floor well 40 in the stern. The water can otherwise be removed from the floor well by periodic bailing. A bow drain hole 45 is also provided.

10 The double hull 12 defines multi-use through-holes 44 that can be used as alternative connection points, e.g. for a sea anchor, for davits, or for multi-use cylinders 46 (described below). Two reinforced, stainless steel towing eyes 48 are mounted in the bow surface, for attachment of a yoke 50, e.g. for attachment of a towline or a sea anchor (not shown). Beackets 52 are provided running along the
15 gunwale 32 on both sides of boat, and a wheel 54 is mounted in lower surface of stern for hauling the boat.

The outer shell 14 is available in white and international orange, or one or both shells 14, 16 may be color-matched, as desired, e.g. to PMS color charts. Regions of the exterior surface 18 of the outer shell 14 are provided with reflective
20 regions 56, making it easier for the dinghy to be seen from other vessels.

The upper region 58 of double hull 12 defines two air-filled, watertight storage compartments 60, 62. Six watertight hatches secure access to storage compartments, with two hatches 64, 66 located in the transom 146 and four hatches 68, 70, 72, 74 located through the interior sidewalls 76 in the cockpit 28. A separate cord (not
25 shown) secures each hatch against loss. The hatches are 6¼ inches (15.9 cm) ID openings, each with a bayonet-secured cover for quick, positive, watertight connection.

Referring to FIG. 4, a keel 80 runs the length of the boat 10 for effective tracking in the water. The keel 80 also defines two handgrips 82, 84 for leveraging the
30 boat to an upright position in case of capsizes. Grooves 86, 88 running along each side of the bottom of the boat also provide tracking, stiffness, and serve as additional handholds.

Referring to FIG. 2, the cockpit 28 has three seats (bow 90, middle 92 and rear or stern 94). The middle seat 92, for rowing, hinges forward (at 93) to provide more
35 legroom when the boat is carrying passengers or cargo. Pairs of stainless steel oarlock seats 96, 98 are provided at two oarlock positions (forward and rear) for receiving

5 stainless steel oarlocks 100, to work in conjunction with re-positioning of the middle seat. The oars 102 are stored in the storage compartments 60, 62 defined by the double hull 12.

Referring to FIGS. 4, 5 and 6, an optional sailing rig 103 may be provided, to be stored with the storage compartments 60, 62 of double hull 12. In a preferred
10 embodiment, the sailing rig 103 includes a telescoping 8-foot, 6-inch (2.6 m) mast 104, a gaff 106, a sail 108 (with reef points 109), two dagger-boards 110, 112, a rudder 114 and a tiller 116. Dagger-board slots 118, 120 are provided through both sides of hull 12 to accommodate the dagger-boards 110, 112 for sailing. At the underside of the dagger-board slots 118, 120, the hull surface defines Bernoulli bumps
15 119, 121 to restrict water from spraying up through the slots 118, 120 into the cockpit 28. A fitting and brace 122 for stepping the mast 104 is secured to the floor surface 26.

Referring to FIGS. 4 and 7-9, the service and survival dinghy 10, in a preferred embodiment, includes an exposure canopy 124, to be erected manually in
20 three sections 126, 128, 130 (canopy spring steel frames or poles 132 are indicated in dashed line in FIG. 2). The exposure canopy 124 has two windows 134, which can be zipped open and closed for ventilation. The middle portion 128 of the canopy 124 and the windows 134 also may be zipped open and closed from inside the cockpit and from outside, for entry, exit, and for access to the sail. The canopy also has additional
25 reflective patches 136 on its outer surface and defines rainwater collection tubes or strips 138. As shown in FIG. 9, the forward section 126 of the canopy 124 may be used alone, e.g. as a dodger when operating the boat 10 with the power motor 140.

Referring next to FIGS. 3, 7 and 8, multi-use cylinders 46, e.g. 3-inch (7.6 cm) diameter by 2-foot (61.0 cm) long, are positioned at each side of boat 10, secured with
30 a line 142 that snaps into through holes 44 at the bow and stern. The cylinders 46 can serve as footholds to stand on if the boat 10 capsizes, making it easier to grasp the handholds 82, 84 in the keel 80 while leveraging the boat back to a righted position. The cylinders 46 also act as additional grab lines, as extra stabilizing flotation, and as bumper guards. Finally, each cylinder 46 has a cover 47 that may be removed, e.g. by
35 pulling handle 149, to deploy a roll-down web ladder 144 contained within the cylinder 46. A weight 145 in the base of the ladder keeps it extended, with the lower

5 end submerged below the surface, to allow boarding of the service and survival dinghy 10 from the water.

Referring to FIG. 9, the service and survival dinghy 10 is provided with outboard motor mounts 141 in two sizes, to accommodate both long shaft and short shaft motors. One motor 140, e.g. a 6-hp motor, is mounted in the transom 146, as
10 shown, while another motor not in use (not shown) may be stowed beneath the rear seat 94.

The storage compartments 60, 62 in the double hull 12 may also be used for storage of optional equipment, including, e.g. the exposure canopy 124, the sailing rig 103, the oars 102, a sea anchor and/or other safety and general equipment. Optional
15 equipment that might be stored within the storage compartments could further include, e.g., a bailing pump (manual or electric), the yoke 50 for towing or to secure sea anchor, and safety and survival equipment, such as flares, a radio, an EPIRB (signal beacon), a first aid kit, etc.

In preferred embodiments, the service and survival dinghy 10 may include an
20 electrical system, including a battery, for powering, e.g. navigational lights, a switch panel for a watertight outlet, e.g. for a spotlight, GPS (global positioning system), interior lights, etc., and to power a light for compass 148.

Other equipment such as the kick-up rudder 114, two dagger-boards 118, 120, and an extra motor mount are stored in a rear storage compartment 150 beneath the
25 rear seat 94.

Referring to FIGS. 10-13, the service and survival dinghy 10 of the invention is shown with different seating arrangements for passengers in survival mode. These seating arrangements are calculated at 75 kg per person, with the boat and equipment weighing 50 kg. In FIG. 10, three-person survival seating is shown, with the middle
30 seat 92 employed as a vertical backrest. FIG. 11 shows four-person survival seating, again with the middle seat employed as a vertical backrest. FIG. 12 also shows four-person survival seating, with the middle seat removed. In FIG. 13, the service and survival dinghy 10 is shown with ten people in quick rescue survival positions, with four people seated in the cockpit, as in FIG. 11, and six people clinging to beackets
35 about the gunwale for flotation assistance.

5 The invention thus provides a dual-function service and survival dinghy 10 (i.e., a self-rescue dinghy) that combines many of the functions of tender, life raft, sailing dinghy, and buoyant apparatus life float. The service and survival dinghy 10, to be available commercially from Portland Pudgy, Inc., of Portland, Maine, under the trademark PORTLAND PUDGY™, is designed to address the critical issue of
10 abandoning ship and also to serve as an everyday service dinghy. The dinghy 10 is relatively unsinkable, easily rowed, motored, sailed, and towed, and it provides many life-saving functions, all in a self-contained unit. Sea anchor, exposure canopy 124, oars 102, and sailing rig 103 (including sail 108, telescoping mast 104, and tiller 116) are all stowed in the large storage compartments 60, 62 in the boat's double hull 12.
15 Additional equipment also can be pre-set in the hull storage compartments. The rudder 114, dagger boards 110, 112, and an extra motor mount 141 stow neatly under the rear seat 94.

 The service and survival dinghy 10 is designed for many recreational boaters who require a tender, but who want a greater degree of safety than is provided by
20 traditional dinghies. Many recreational boaters have dinghies which when swamped, become non-functioning. Few boaters carry inflatable life rafts. While not duplicating all the functions of the inflatable life raft, the dinghy 10 does have many similar features and surpasses some of them.

 The service and survival dinghy 10 is proactive and can be sailed, motored, or
25 rowed to land or shipping channels, unlike life rafts, which are completely dependent on outside rescue. The dinghy 10 is relatively unsinkable, rugged, does not need to inflate, and has large watertight storage compartments 60, 62 for survival and other equipment. The dinghy is extremely buoyant, e.g., its double hull 12 is a hard shell 14, 16 of polyethylene bonded to closed-cell polyethylene foam, with the lower
30 portion 22 completely filled with closed-cell polyurethane foam 24, which can support 660 lb. (300 kg), i.e., four people at 75 kg. each, with 7¼ inches (18.4 cm) of free board. Even if swamped, the dinghy maintains 1,100 lbs. (500 kg) of buoyancy. The double hull 12 is not subject to puncture, and it is much more rugged and durable than a life raft, which can deteriorate and even disintegrate, and which often needs
35 constant pumping to maintain its buoyancy. Furthermore, if the dinghy 10 is swamped and all six watertight storage access hatches 64, 66, 68, 70, 72, 74 are accidentally

5 flooded, it still has 340 lbs. (156 kg) of flotation. All watertight hatch covers are secured to the boat by cords to avoid loss. If water does breach a hatch, it can easily be pumped out.

While the service and survival dinghy 10 was originally designed for the recreational boater, it can also find service in the small commercial boating industry
10 for one to four crewmembers. The dinghy 10 is small enough to be carried on deck, and can be quickly launched, thus serving as a life platform. In addition, the dinghy 10 is easy and fun to sail, extremely stable, reliably unsinkable, and thus a perfect boat for children. The dinghy 10 can also serve as a life float in quick rescue situations, supporting people both in the boat and holding onto beackets 52 on the
15 outside of the boat (similar to the Jim-Buoy® buoyant apparatus commonly used on charger boats and fishing boats with beackets along the sides and a large floating chamber).

The ease of handling and stability of the service and survival dinghy 10 makes it a safe and fun recreational boat in itself (perfect for kids, for diving, or as a work
20 deck for fishing or loading film).

The dinghy 10 is broad of beam for stability but it is also lightweight and easy to maneuver. It sails beautifully, and rows, motors, and tracks well. The dinghy is easily transportable on the roof of a car, or in the back of most station wagons or vans. Optional equipment, including the conversion kit 103 for sailing, the exposure canopy
25 124, and a sea anchor, can all be neatly stowed, along with other personal safety equipment, under the rear seat 94 and within the sidewall compartments 60, 62 of the boat 10.

The service and survival dinghy 10 is durable, rigid, lightweight, and has a very high flotation capability, comparable only to some life rafts and inflatables. In
30 contrast, most dinghies, when swamped, are difficult or impossible to bail out. A swamped dinghy cannot be maneuvered, and exposure can rapidly become life threatening. The relatively smaller interior volume of the dinghy 10, and its very high flotation capability, allows it to be easily bailed, and it is even self-bailing when empty. If filled with water, the dinghy 10 still has approximately 1,100 lbs. (500 kg)
35 of buoyancy.

5 The dinghy 10 is different from both the popular rubber inflatable dinghy and the expensive inflatable life raft. The rubber inflatable dinghy tracks poorly, is vulnerable to puncture, is not aesthetically appealing, and is difficult to maneuver. The dinghy 10 does not have all of the features of a sophisticated life raft; however, these rafts are expensive and require costly annual maintenance. In addition, life rafts
10 are subject to puncture, and they are designed to be static in the water. Unlike life rafts, the dinghy 10 allows the user to be pro-active in an emergency; it can be rowed, motored, or sailed toward shipping lanes, land and safety.

 A number of embodiments of the invention have been described.
15 Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope of the following claims.

5 **WHAT IS CLAIMED IS:**

1. A service and survival dinghy (10) comprises a double hull (12) formed of impact resistant polymeric material and defining a bottom compartment (22) containing closed-cell foam (24) for permanent flotation capability and sidewall compartments (60, 62) accessible for storage.

10 2. The service and survival dinghy of claim 1, wherein the double hull is formed of rotation-molded polyethylene or other suitable plastic.

3. The service and survival dinghy of claim 1, further comprising a sailing rig (103) comprising a mast (104) and a sail (108).

15 4. The service and survival dinghy of claim 3, wherein the mast and sail are stored between uses within said sidewall compartments.

5. The service and survival dinghy of claim 1, comprising a center seat (94) mounted to be flipped from a center position to a position toward the bow, thereby to allow a rower more legroom.

20 6. The service and survival dinghy of claim 1, further comprising beackets (52) mounted to gunwale surfaces (30).

7. The service and survival dinghy of claim 1, further comprising a removable exposure canopy (124).

8. The service and survival dinghy of claim 7, wherein said exposure canopy is stored between use within said sidewall compartments.

25 9. The service and survival dinghy of claim 7 or claim 8, wherein said exposure canopy comprises multiple separate panels (126, 128, 130).

10. The service and survival dinghy of claim 1, further comprising a transom plate (141) mounted in a recessed space in the stern for mounting an outboard motor (140).

30 11. The service and survival dinghy of claim 1, wherein the dinghy is self-draining when empty, with a removable plug (42).

12. The service and survival dinghy of claim 1, further comprising a multi-use cylinder (46) secured along a gunwale (32) of said dinghy and comprising a cover (47) within which there is disposed a deployable web ladder (144) for boarding the dinghy.

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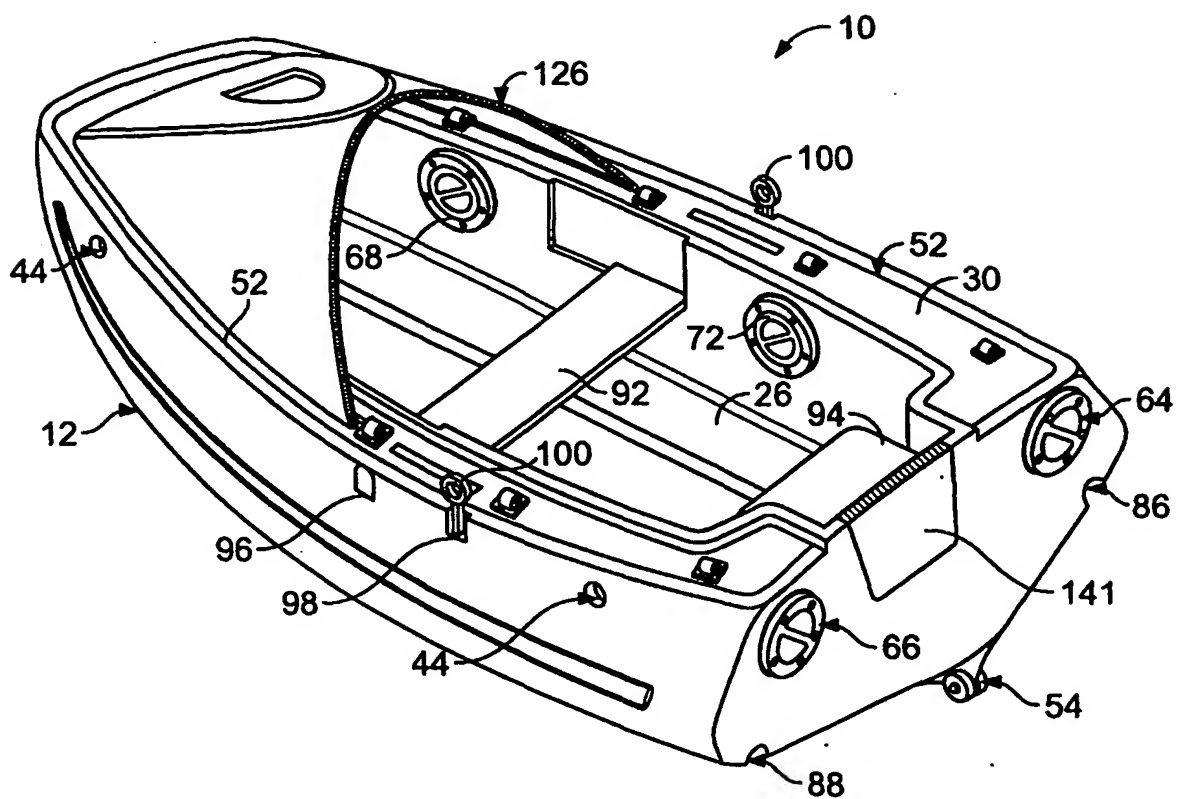


FIG. 1

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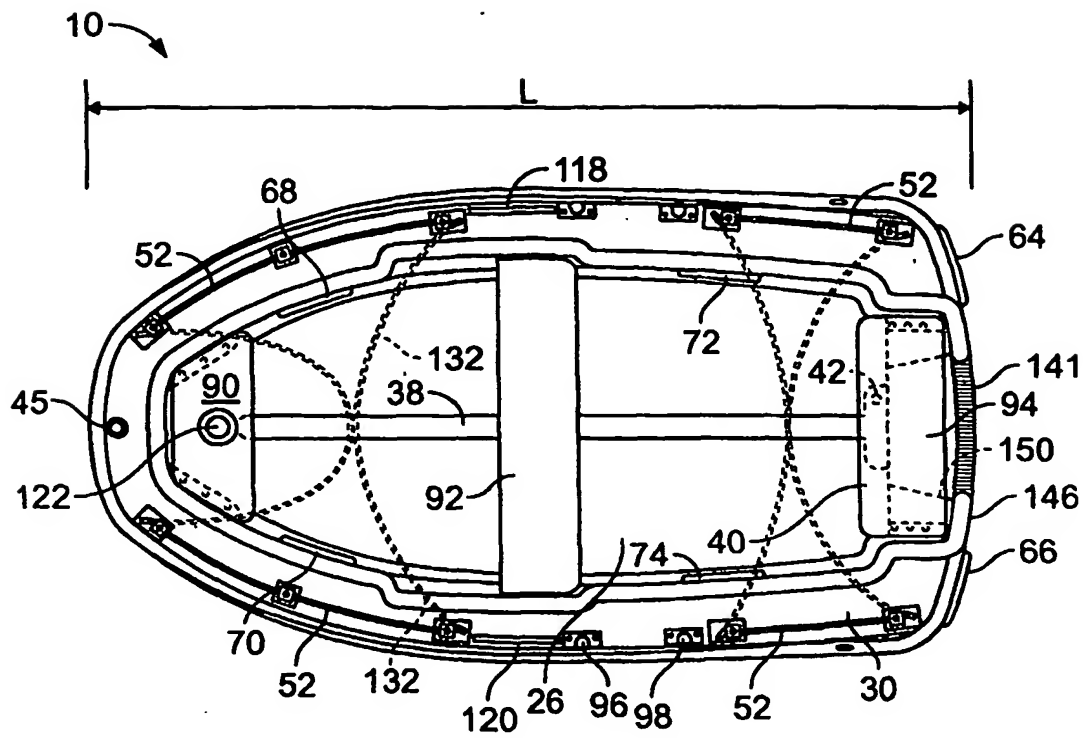


FIG. 2

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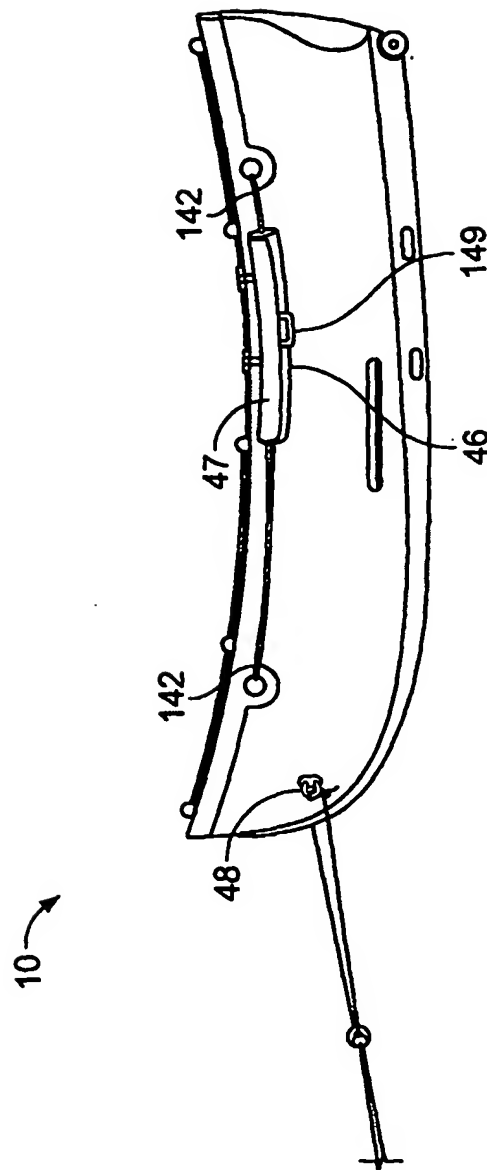


FIG. 3

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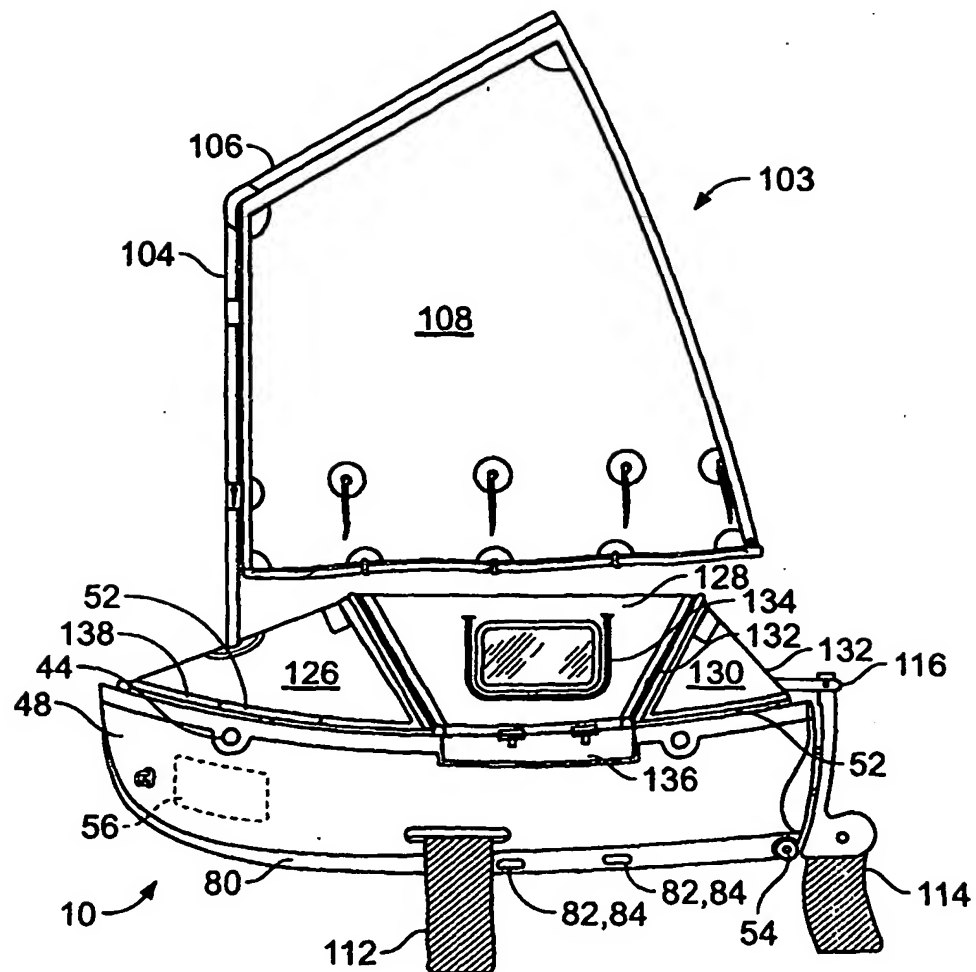


FIG. 4

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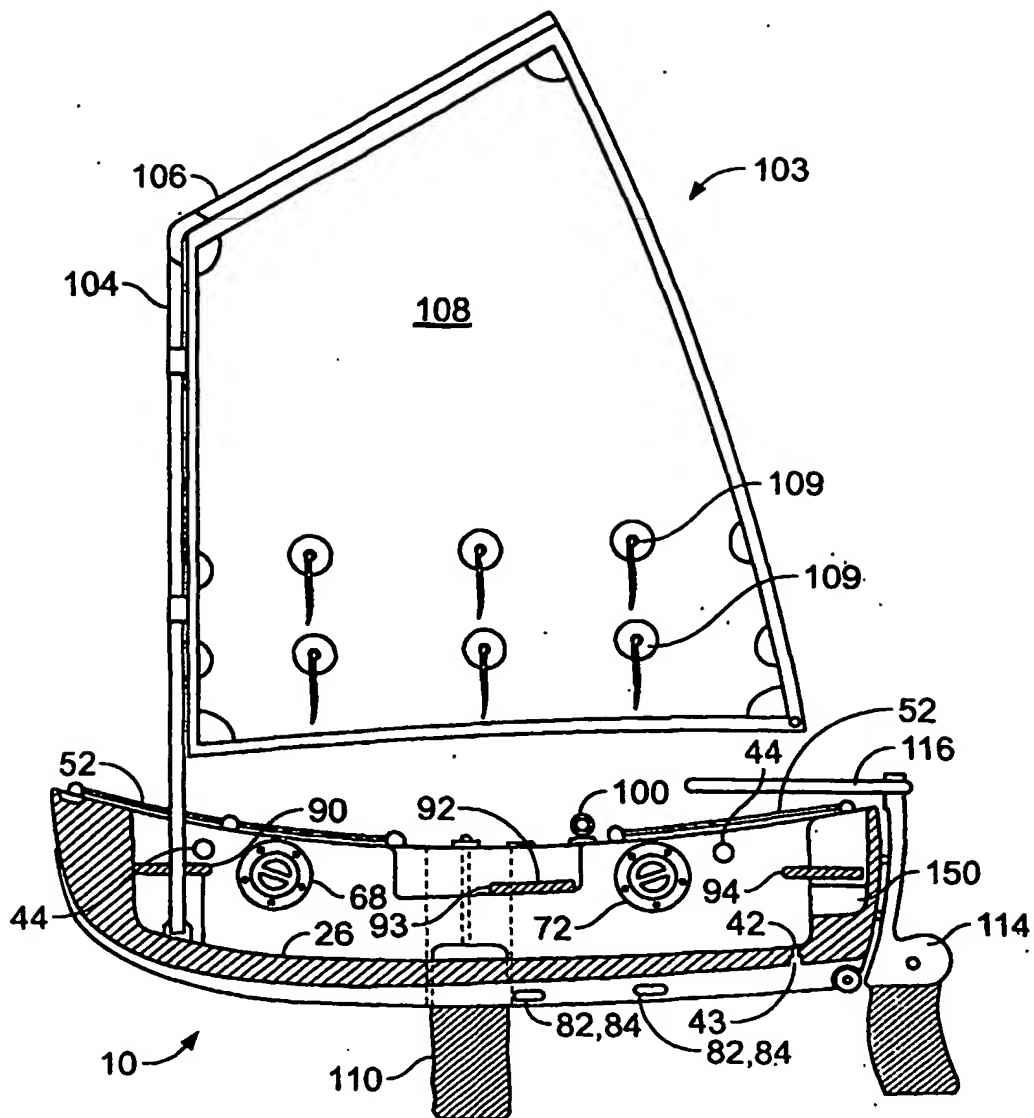


FIG. 5

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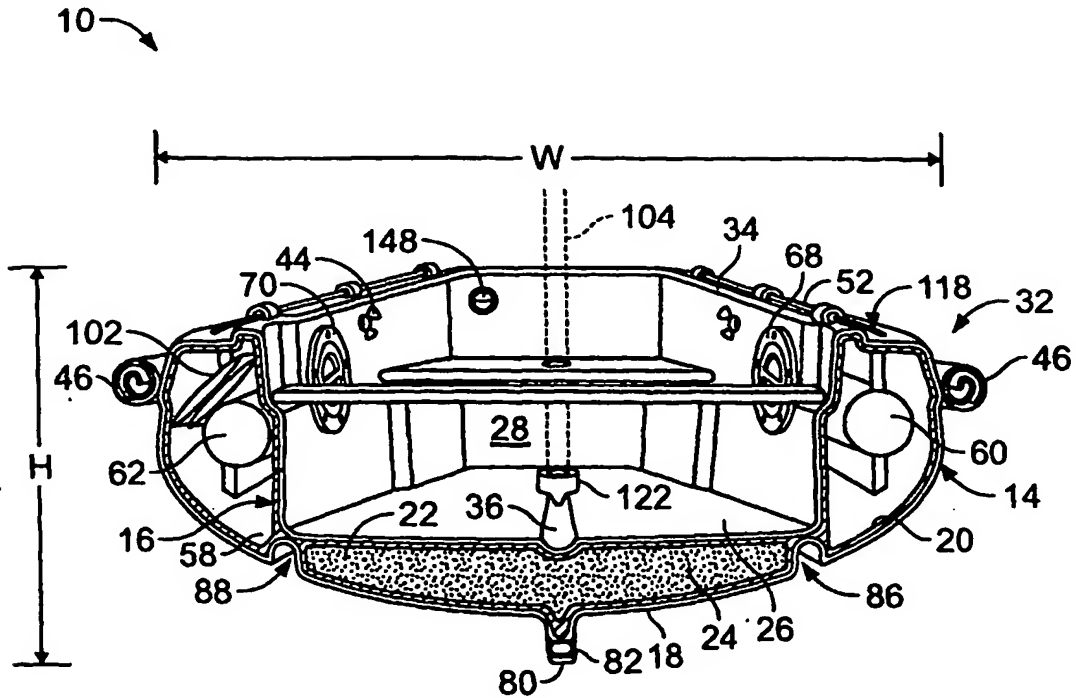


FIG. 6

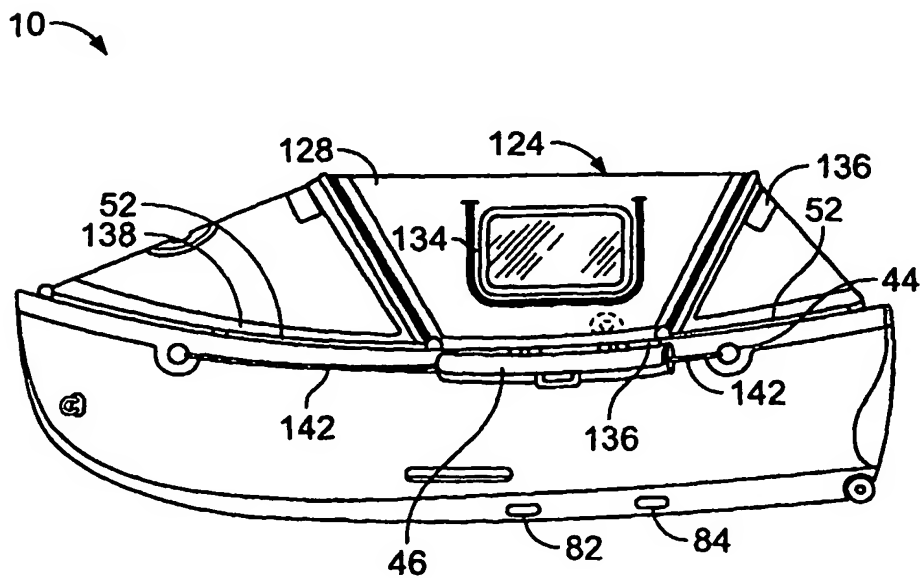


FIG. 7

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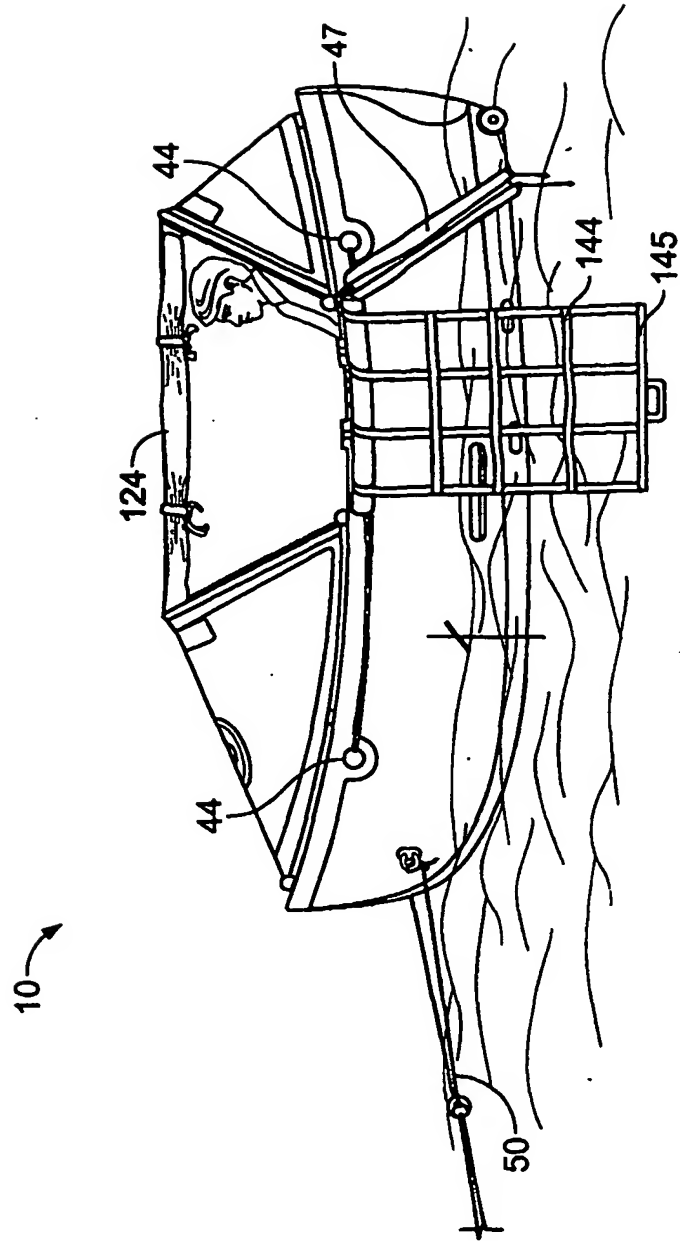


FIG. 8

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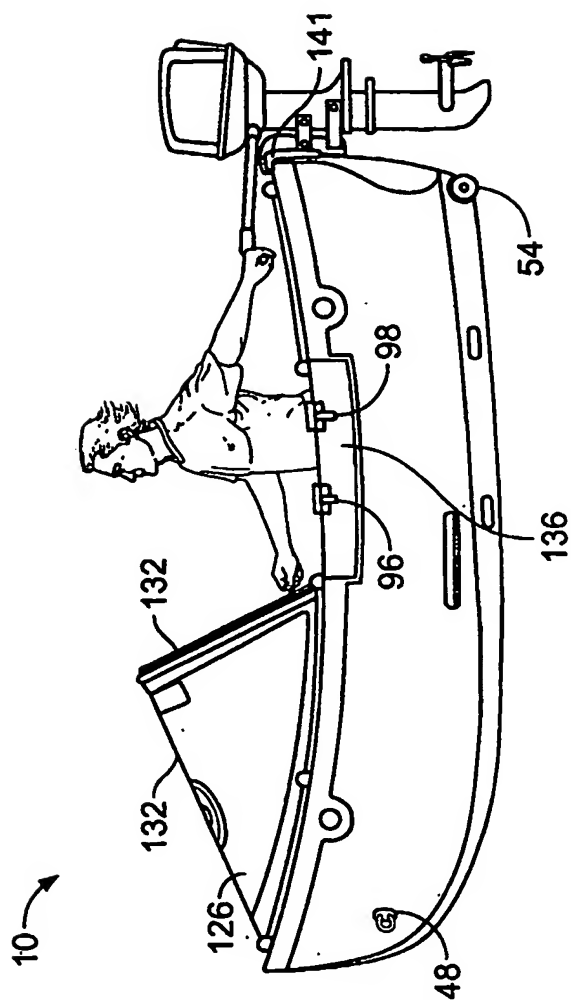


FIG. 9

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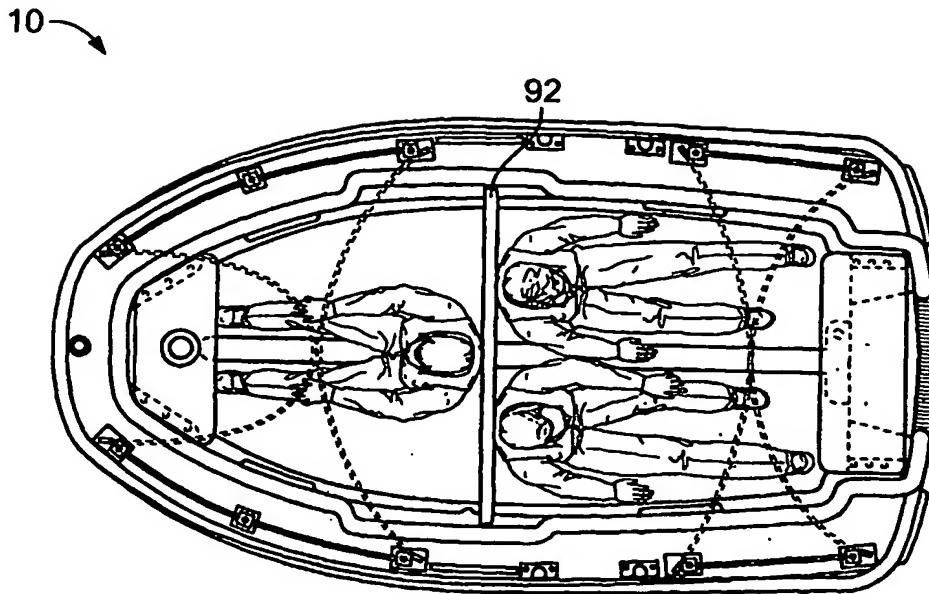


FIG. 10

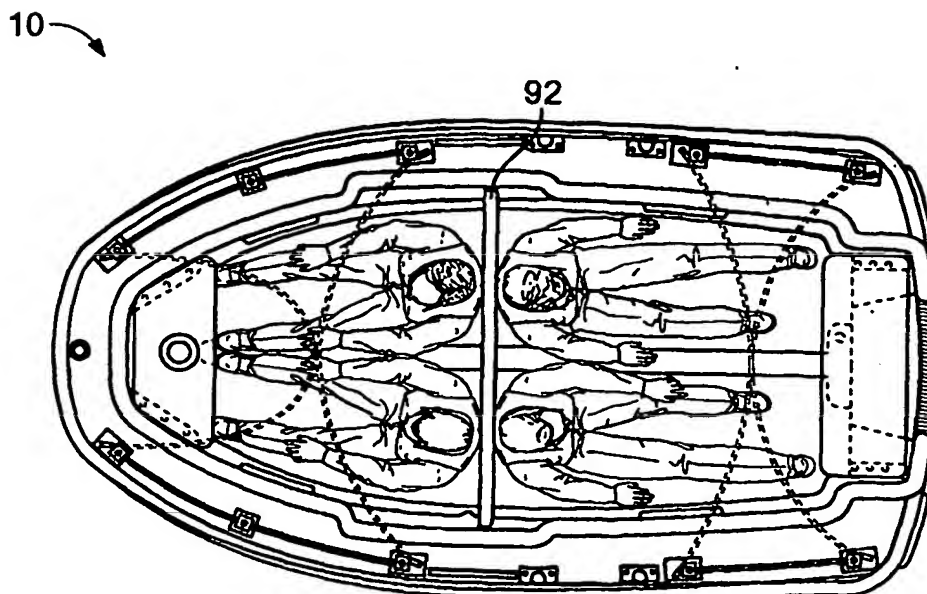


FIG. 11

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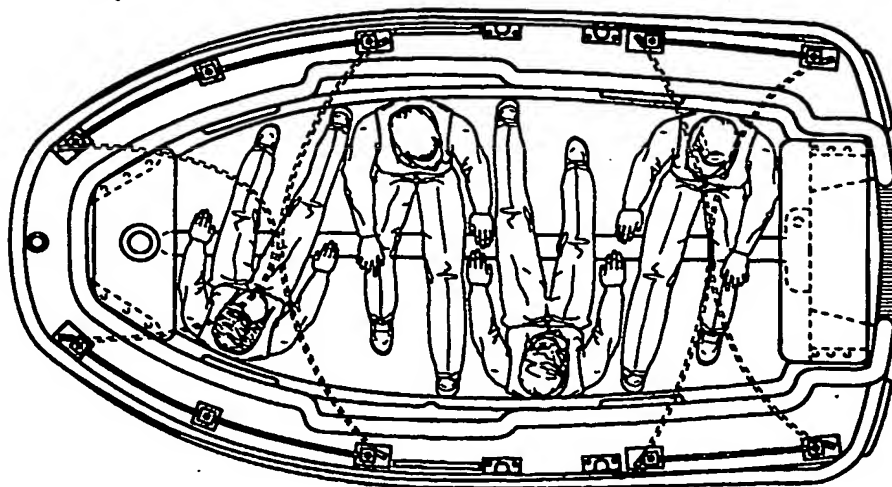


FIG. 12

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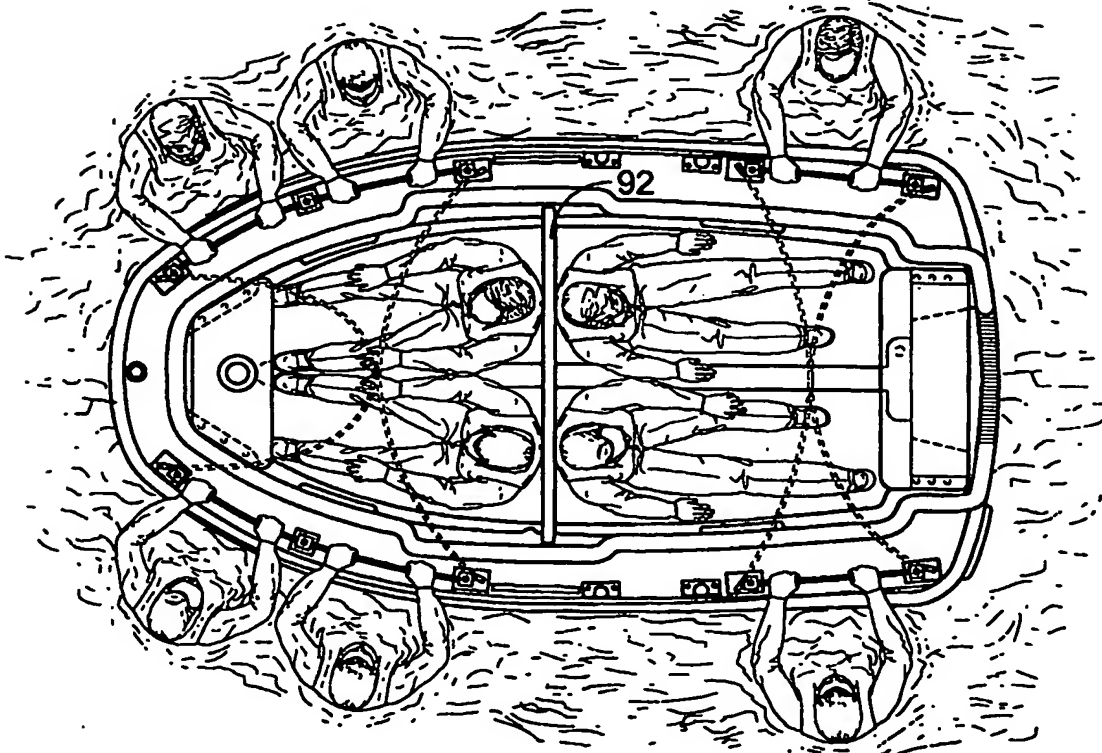


FIG. 13